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The Oldest Known Site of the Roman snail (*Helix pomatia* L.) in the Ślęża Mountain (SW Poland)

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ABSTRACT: Study on the distribution of the Roman snail in the Ślęża Massif was carried out in 2016. The species was recorded at the foot of the Ślęża and Radunia Mountains, on their slopes (to the 300 m a.s.l.) and at the top of the Ślęża Mountain. The slopes of the Ślęża and Radunia Mountains are covered with spruce and beech forests without undergrowth which is unfavorable for this snail. Therefore, we suspect that the population of the species on the top of the Ślęża Mountain is an isolated and the oldest population of *Helix pomatia* recorded in Poland.

Keywords: Distribution; Isolation; Mollusca; Nunatak; Radunia Mountain.

The native range of the Roman snail *Helix pomatia* L. covers southern part of Poland [1]: Małopolska, Górny Śląsk and Podkarpacie [2]. The common occurrence of the species in the country at the present time results from the human activity [3]. The prominent role in the introducing the snail had monks who have bred the Roman snail for consumption in monastery gardens for the Middle Ages [1, 2].

Although, the current range of the Roman snail in Poland is well recognized [2-5], the origin of some populations of the species is unclear and arises curiosity. One of such populations is located at the top of the Ślęża Mountain (Dolny Śląsk, SW Poland). This ground plot has been known for over 140 years, and the first mention about the occurrence of *Helix pomatia* in this place can be found in Reinhardt [6]. Also Wiktor [7] reports occurrence of the species in the area of the top and bottom of the Ślęża Mountain, near the forester's lodge Tąpadło.

The Ślęża Massif is the highest elevation of the Sudeten Foreland (the Ślęża Mountain rises to 718 m a.s.l.), and is higher than surrounding planes over 500 meters (Figure 1A). In Cenozoic Era, in the Pleistocene, the Ślęża Massif was glaciated twice: during Mindel glaciation (730,000-440,000 years ago) and Riss glaciation (300,000-130,000 years ago) [8, 9]. The peak of the Ślęża Mountain however was exposed and not covered with an ice. Thus it was the nunatak that raised about 100 meters above the ice surface [10]. The harsh climate of those times has shaped boulder fields which are currently covered with spruce and oak forests (Figure 1B, C) [10].

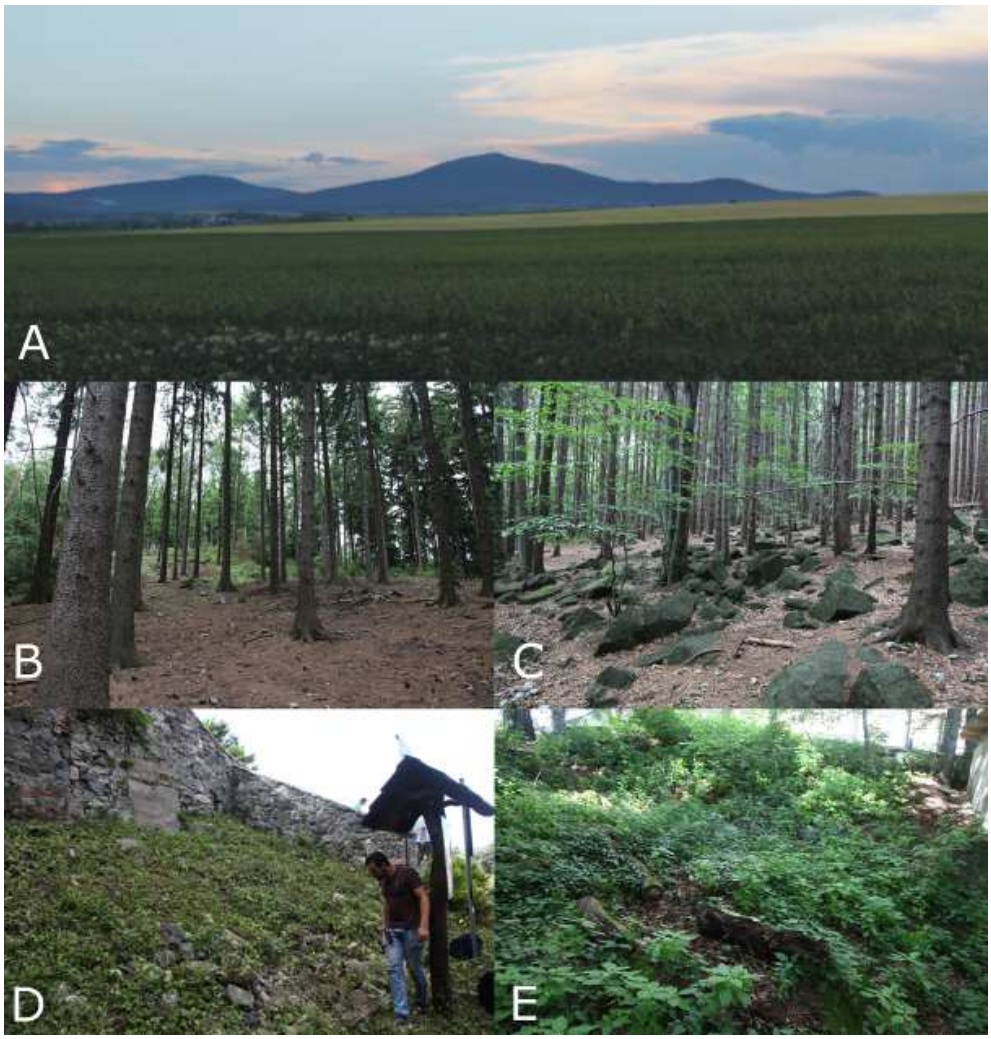

Figure 1. (A) Ślęża Massif, (B) spruce forests and (C) oak forests devoid of undergrowth growing on the slopes of Mt, (D) the site of the Roman snail at the top of the Ślęża Mountain, church of the Visitation of the Blessed Virgin Mary, (E) the site of the Roman snail near the transmission tower.

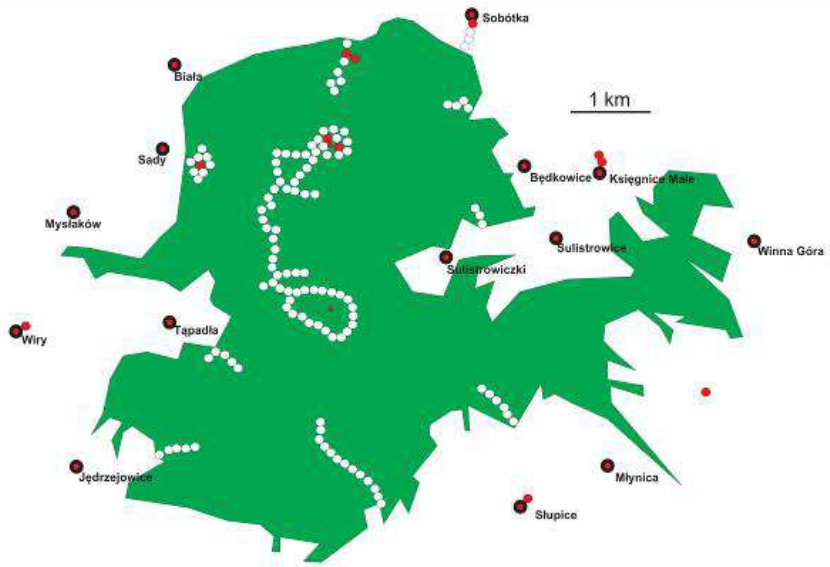

Figure 2. The distribution of the studied plots in the Ślęża Massif: red spot indicates the presence of the Roman snail, however on the Sady village only empty shell was found; while color – the snail was not recorded.

The study in the Ślęża Massif was carried out in June and July 2016. The Roman snail was searched in 130 plots (Figure 2). Each plot had an approximate area of 2000 m^2 (100 m × 20 m) and was searched by eye by three persons for at least 5 minutes per person. Snails were searched between 9 a.m. and 3 p.m., after rain, in the temperature of 20-25^{o}C. The presence of both: live snails and empty shells were recorded. The snails were searched mainly along the main touristic routs that lead to the Ślęża and Radunia peaks, as well as in the villages at the foot of the mountains. The following habitats were searched: diverse types of forests growing on the slopes of the mountains, as well as boulder fields, meadows as well as walls of buildings at the top of the Ślęża Mountain.

The Roman snail was recorded in 9 sites (the species has been detected at 11 of the 130 studied plots, however two plots near Księginice Małe and two plots in Chwałków were in the closest vicinity and thus the two neighboring points in the mentioned villages were considered as one site). Within these 9 sites, at one site in the Sady village, only one empty shell of the species was found (Table 1). The live individuals were recorded at the top of the Ślęża Mountain, i.e. near the church of the Visitation of the Blessed Virgin Mary (Figure 1D) and in the vicinity of the transmitter tower (Figure 1E), as well as at the foot of the Ślęża and Radunia mountains. The occurrence of *Helix pomatia* has not been confirmed at the bottom of the Ślęża Mountain in the Tąpadło area mentioned by Wiktor [7].

Table 1. The sites of the Roman snail recorded in the Ślęża Massif: geographical coordinates (Geo. coor.) and site description.

Site	Geo. coor.	Site description	Comment
1	50°51’53.94”N 16°42’30.45”E	697 m a.s.l. – the peak of the Ślęża Mt, near the church of the Visitation of the Blessed Virgin Mary. Boulder field covered with mowed herbaceous vegetation	Adults and juveniles
2	50°51’52.58”N 16°42’34.64”E	694 m a.s.l. – the peak of the Ślęża Mt, near the transmission tower, a deciduous forest	Two adult individuals
3	50°51’48.17”N 16°40’39.95”E	284 m a.s.l – Sady village, a western slope of Ślęża. Mixed forest, with hazel shrubs, rich undergrowth	An empty shell
4	50°53’09.38”N 16°42’39.19”E	239 m a.s.l - Chwałków village, northern slope of Ślęża, park near a castle	A few adult individuals
5	50°53’42.71”N 16°44’32.71”E	199 m a.s.l - Sobótka village, municipal stadium and allotments	A few adult individuals
6	50°51’52.70”N 16°46’18.52”E	188 m a.s.l - Księginice Małe village, a cemetery, plantings near a road	Abundant adult and juvenile individuals
7	50°50’10.46”N 16°38’29.78”E	224 m a.s.l - Wiry village, a ruined building	A few adult individuals
8	50°49’35.22”N 16°46’59.87”E	211 m a.s.l - Domaszów village, a deciduous forest near a lake	A few adult individuals and empty shells
9	50°48’50.64”N 16°44’58.87”E	231 m a.s.l - Słupice village at the foot of Radunia, a cemetery	A few adult individuals and empty shells

The possible origin of the isolated population at the top of the Ślęża Mountain

Sites of the Roman snail in the Ślęża Massif were recorded to a height of 284 m a.s.l. and at the top of the Ślęża Mt. (Figure 2) i.e. at 694-697 m a.s.l. Although, we noticed only a few individuals at the mountain’s

peak, the presence of both: juveniles and adults was recorded. Thus, we suspect that the population maintains for quite some time in this site. On the other hand, the Roman snail was not found on the slopes of the Ślęża and Radunia mountains as well as at the top of Radunia Mountain (Figure 2). Sites devoid of snails are covered mainly with spruce and beech forests which are devoid of undergrowth (*Fagetum nudum* and *subnudum*) (Figure 1 D, E). We suspect, that the Roman snail was introduced to the top of the Ślęża Mountain by the human. However, we do not know if this introduction was intended or accidental and when it had happened. The Ślęża Mountain was the holy place of the heathen tribes of the Lusatian culture, which origin reaches The Bronze Age [10]. Thus, the exploitation of the Ślęża peak started about 4000 years ago. It is unlikely that the Roman snail was introduced at that time, but this option cannot be rejected. It is more likely that monks contributed to the origin of this population. In the Ślęża Mountain, the Augustinian monastery was built in XII century [10] and perhaps the Roman snail was bred in the monastery garden. The snail could be also introduced accidentally, i.e. brought with the material that was used for building the monastery. In this case, the age of the population is about 900 years. However, there is no reliable data to confirm this hypothesis.

The next potential date of the introduction is 1837 when Germans built Mooshaus shelter or in 1851-1852 when the next building in the Swiss style was rose [10]. The possibility that the Roman snail was accidentally brought to the top of the Ślęża Mountain at that time is discussed by Reinhardt [6]. This author enumerates this species among other snail species found in the area of the Ślęża Mountain. If his observations are indeed about the top of the Ślęża Mountain, then this means that we have a place in which the population of *Helix pomatia* has remained for over 144 years, which is the oldest recorded population of *Helix pomatia* in Poland and Europe [11-13].

From the beginning of the XX century, the shelter start to be inefficient and thus in the years 1907-1908 the 'Dom Turysty PTTK' was built. In each of those times, the snails could have been additionally introduced with the building materials, which enlarged the existing population with new specimens. In this case the age of the population is 111 years.

There is no doubt that the population of Roman snails observed at the top of the Ślęża Mountain has existed since the beginning of the 50's of the last century, which is also evident in the observations presented by Wiktor [7]. This means that it is the oldest (68 years old) recorded population of the Roman snail in Poland. The earlier studies confirm occurrence of the snail in this area but on other site for at least 15 years [14]. Considering, however, the area of all Europe, the oldest recorded population of Roman snail lasts for 125 years [13]. Other populations, older than this in the Ślęża Mountain, were also described from Netherlands [11, 12].

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